

## WHAT IS CLAIMED IS:

1. An expression vector comprising, in frame and in order, a pre sequence, a pro sequence, and a cloning site for in frame insertion of a catalytic domain cassette.
- 5 2. The expression vector of claim 1, additionally comprising a tag sequence in frame with the cloning site.
- 10 3. The expression vector of claim 2 wherein said vector comprises a DNA sequence selected from the group consisting of SEQ.ID.NO.:1, SEQ.ID.NO.:2, SEQ.ID.NO.:3, SEQ.ID.NO.:4, SEQ.ID.NO.:5, and SEQ.ID.NO.:6.
- 15 4. The expression vector of claim 1, wherein said vector contains a catalytic domain cassette inserted in frame into the cloning site.
5. A recombinant host cell containing the expression vector of claim 4.
6. A process for expression of a zymogen, comprising:
  - 20 (a) transferring the expression vector of claim 4 into suitable host cells; and
  - (b) culturing the host cells of step (a) under conditions that allow expression of the zymogen expression vector.
- 25 7. The process of claim 6, wherein said expression vector comprises a nucleotide sequence selected from a group consisting of SEQ.ID.NO.:1, SEQ.ID.NO.:2, SEQ.ID.NO.:3, SEQ.ID.NO.:4, SEQ.ID.NO.:5, SEQ.ID.NO.:6, SEQ.ID.NO.:7, SEQ.ID.NO.:8, SEQ.ID.NO.:9, SEQ.ID.NO.:10, SEQ.ID.NO.:59, and SEQ.ID.NO.:60.

8. A serine protease catalytic domain produced from a recombinant host cell containing the expression vector of claim 4, which functions as a serine protease when said protein is cleaved at the pre sequence.

5 9. A serine protease catalytic domain produced from a recombinant host cell containing the expression vector of claim 8 wherein the amino acid sequence is selected from a group consisting of SEQ.ID.NO.:11, SEQ.ID.NO.:12, SEQ.ID.NO.:13, SEQ.ID.NO.:14, SEQ.ID.NO.:53, SEQ.ID.NO.:54, and functional derivatives thereof.

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10. The protease of claim 8, wherein said protease is bound to Ni-NTA silica or Ni-NTA agarose beads.

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11. A method for identifying compounds that modulate the activity of a protease expressed from the expression vector of claim 4, comprising:

- (a) combining a modulator of protease activity, protease protein, and a labeled substrate; and
- (b) measuring a change in the labeled substrate.

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12. The method of claim 11 wherein the labeled substrate is selected from the group consisting of flourogenic, colormetric, radiometric, and fluorescent resonance energy transfer (FRET).

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13. A compound active in the method of Claim 11, wherein said compound is a modulator of a serine protease catalytic domain.

14. A compound active in the method of Claim 11, wherein the effect of the modulator on the protease is inhibiting or enhancing its enzymatic activity.

15. A compound active in the method of Claim 11, wherein the effect of the modulator on the protease is stimulation or inhibition of proteolysis mediated by the expressed catalytic domain.
- 5 16. A pharmaceutical composition comprising a compound of Claim 13.
17. A pharmaceutical composition comprising a compound of Claim 13, wherein said compound is a modulator of a protease selected from the group consisting of SEQ.ID.NO.11, SEQ.ID.NO.12, SEQ.ID.NO.13, SEQ.ID.NO.14, SEQ.ID.NO.53, SEQ.ID.NO.54, and functional derivatives thereof.
- 10 18. A method of treating a patient in need of such treatment for a condition that is mediated by a protease, comprising administration of the compound of Claim 13.
- 15 19. A kit comprising the expression vector selected from a group consisting of the expression vector of claim 1, the expression vector of claim 4, and functional derivatives thereof.
- 20 20. A kit comprising the nucleic acid sequence selected from the group consisting of, SEQ.ID.NO.:1, SEQ.ID.NO.:2, SEQ.ID.NO.:3, SEQ.ID.NO.:4, SEQ.ID.NO.:5, SEQ.ID.NO.:6, SEQ.ID.NO.:7, SEQ.ID.NO.:8, SEQ.ID.NO.:9, SEQ.ID.NO.:10, SEQ.ID.NO.:59, SEQ.ID.NO.:60 and fragments thereof.
- 25 21. A kit comprising a serine protease protein selected from the group consisting of, SEQ.ID.NO.:11, SEQ.ID.NO.:12, SEQ.ID.NO.:13, SEQ.ID.NO.:14, SEQ.ID.NO.:53, and SEQ.ID.NO.:54.
22. A pharmaceutical composition comprising the serine protease catalytic domain of claim 9.

23. The pharmaceutical composition of claim 24 wherein said composition is a topical skin care composition.

5 24. A non-pharmaceutical composition comprising the serine protease catalytic domain of claim 9.

10 25. The non-pharmaceutical composition of claim 23 wherein the composition is selected from the group consisting of a laundry detergent, shampoo, hard surface cleaning compositions, and dish-care cleaning compositions.

15 26. A method of treating, either prophylactically or acutely, an imbalance of desquamation comprising topical application of the composition of claim 23.